

January 1, 2015

Actuarial Valuation Report

**Town of Hanover
Other Post-Employment Benefits**

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SECTION I - MANAGEMENT SUMMARY

Introduction

This report presents the results of the actuarial valuation of the Town of Hanover Other Post-employment Benefits as of 1/1/2015. The valuation was performed for the purpose of measuring the actuarial accrued liabilities associated with these benefits and calculating a funding schedule. These results are used in satisfying the requirements under the Governmental Accounting Standards Board Statement No. 45.

The valuation was based on participant data as of 1/1/2015 supplied by Hanover and the Massachusetts Teachers Retirement System. The provisions reflected in the valuation are based on Chapter 32B of the General Laws of the Commonwealth of Massachusetts and related statutes and the benefits provided by the Town.

This actuarial valuation involves estimates about the probabilities of events as well as the projection of amounts far into the future. Our figures should be considered a "best estimate" of the future events and not a prediction. As such, actual results are unlikely to mirror our results. All amounts determined in this valuation will be subject to continual review as actual results are compared to past estimates and new estimates are made about future events.

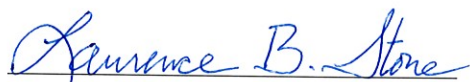
We, Lawrence Stone and Kevin Gabriel, are consultants for Stone Consulting, Inc. and are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

We are pleased to present the results of this valuation. We are available to respond to any questions on the content of this report. Please note that this report is meant to be used in its entirety. Use of excerpts of this report may result in inaccurate or misleading understanding of the results.

Respectfully submitted,

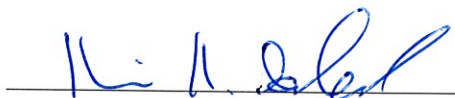
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October 11, 2016



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Summary of Actuarial Results

The actuarial values in this report were calculated consistent with the Governmental Accounting Standards Board (GASB) Statement No. 45, Accounting and Financial Reporting by Employers for Postemployment Benefits Other Than Pensions, issued June 2004. Values at two discount rates are presented. The 7.50% discount rate represents the expected rate of return for a funded plan with a longer-term investment horizon. For an unfunded plan, the GASB Statement No. 45 calls for the use of a discount rate approximating the rate of return of Hanover's general assets. The rate we used for Hanover is 4.00%. While Hanover has set up a "stabilization fund" for its OPEB liabilities, the fund is not an irrevocable trust. Therefore, these assets do not count according to GASB Statement No. 45. The OPEB liability is extremely sensitive to this assumption. Use of the unfunded rate instead of the funded rate causes the Annual Required Contribution (ARC), Accrued Actuarial Liability (AAL), and the Normal Cost to increase dramatically.

The summary results are as follows:

- Actuarial Accrued Liability ("AAL") is the "price" attributable to benefits earned in past years. The total AAL as of 1/1/2015 (at the 4.00% discount rate) is \$37.82 million. This is made up of approximately \$21.42 million for current active Hanover employees and approximately \$16.4 million for Hanover retirees, spouses and survivors.
- The Normal Cost is the "price" attributable to benefits earned in the current year. The Normal Cost as of 1/1/2015 (at the 4.00% discount rate) is approximately \$2 million.
- Based on a 23-year funding schedule at a 4.00% discount rate, the Fiscal 2016 contribution would be \$3,942,428. This figure is referred to as the Annual Required Contribution (ARC). These compare to the pay-as-you-go contribution of the existing costs for current retirees of \$1,043,381. For an illustration of how payment of the ARC impacts the funding of the plan over time, please refer to the "Illustrative Funding Schedule" discussion beginning on page 12 and the accompanying table on page 26. The following table shows the breakdown of the Actuarial Accrued Liability between future retirees and current retirees, as well as the normal cost, at Hanover's different discount rates:

Actuarial Results as of 1/1/2015	7.50% Rate	4.00%Rate
Current Actives	\$10,622,896	\$21,421,001
Current Retirees, Beneficiaries, Vesteds, and Survivors	\$11,435,672	\$16,397,944
Total AAL	\$22,058,568	\$37,818,945
Funding	\$0	\$0
Total Unfunded AAL (UAAL)	\$22,058,568	\$37,818,945
Normal Cost 1/1/2015	\$877,526	\$1,965,780
Normal Cost 1/1/2016	\$943,340	\$2,053,257
FY2016 ARC (Uses 30 yrs for Fully Funded; 23 Yrs for Unfunded)	\$2,274,048	\$3,942,428

Change from Prior Valuation

Hanover's last valuation of its OPEB liability was done as of January 1, 2011. The following table provides a comparison of some of the key figures:

Category	1/1/2015 Figure (4.00%)	1/1/2011 Figure Projected to 1/1/2015 (4.25%)	% Change
AAL	\$37.8 million	\$61.0 million	-38.0%
Assets	\$0.0 million	\$0.0 million	N/A
UAAL	\$37.8 million	\$61.0 million	-38.0%
Normal Cost	\$2.0 million	\$2.7 million	-26.7%
Amortization Cost	\$1.7 million	\$2.8 million	-39.7%
ARC	\$3.7 million	\$5.5 million	-33.4%
Pay-As-You-Go for Year 1	\$1.0 million	\$1.8 million	-46.1%

The following addresses the reasons behind these changes:

- 1) Mortality was on a generational basis instead of being projected to 2011 in the last valuation. This added about 20% to the Normal Cost and about 15% to the AAL. The mortality assumption was consistent with the most recent State of Massachusetts OPEB valuation.
- 2) The change in the discount rate from 4.25% to 4.00% increased the Normal Cost by 7% and increased the AAL by 5%
- 3) The change in the participation rate from 80% to 67.5% for future retirees decreased the Normal Cost by 17% and AAL by 11%.
- 4) Changes in claims and trend rates decreased the normal cost by 42% and decreased the AAL by 38%. This was related to the change to rate saver plans.
- 5) The change in the population age, service and make-up increased the Normal Cost by 2% and reduced the AAL by 20%. These figures were arrived at by running the prior population (including the plans then in-force) through the current valuation (current claims, trends, plan factors, etc.) at the prior valuation date (thus keeping the prior population ages at those in the prior run and not letting the population age).

Note: changes are shown from prior set of results to the new set of results based on discrete changes in assumptions. Often changes interact with each other. Due to this interaction, one cannot simply add up the individual changes to get the total change. Also, the 4-year gap between the 1/1/2011 valuation and the 1/1/2015 valuation makes the comparison difficult.

The following table summarizes the changes in assumptions between the two valuations:

	Current Val (1/1/2015) (4.00%)	Prior Val (1/1/2011) (4.00%)
Mortality	Generational Projection with a base year of 2000 using RP-2000, Scale BB	RP2000 Projected 11 Years by Scale AA
Retiree Participation	67.5%/25%	80%
Participating Spouse %	50%	80%
Plans Pre-65	100% MC/0%IND	100% MC/0% IND
Plans Post-65(Medicare Only)	100% IND/0% MC;	79% IND/20% MC
Family % Pre-65/Post-65	30%/30%	45%/15%
Claims age 65 COMMC Blended (Pre-65/Post-65)	\$18,759/\$18,759	\$20,231/\$14,554
Claims age 65 COMIND Blended (Pre-65/Post-65)	NA/NA	NA/NA
Claims age 65 MEDMC/MEDIND (Pre-65/Post-65)	NA/\$3,901	\$5,424/\$3,847
Cumulative Trend Years 1-10		
Commercial MC	76%	93%
Commercial IND	NA	NA
Medicare MC	NA	80%
Medicare IND	85%	98%
# Actives	561	515
# Retirees and Vested Terms	400	322
# Retirees and Spouses with Med	284	248

Table abbreviations:

- COM: Commercial / MED: Medicare
- IN: Indemnity / MC: Managed Care

Valuation Methodology and Assumptions

VALUATION METHOD

The valuation of the other post-employment benefits is based upon the projected unit credit actual cost method. Under this method, future health care benefit costs (including Medicare reimbursements) are projected using assumed rates of annual health care cost increases (health care cost trend rates). The cost of future expected life insurance death benefits is added to the projected medical cost. The actuarial value of the future expected benefits is allocated proportionately over a health plan member's working lifetime.

A normal cost (or service cost) is determined for each year of the member's creditable service and is equal to the value of the future expected benefits divided by the total expected number of years of service. This is similar to a normal cost in a retirement actuarial valuation. The Actuarial Accrued Liability is the accumulated value of prior normal costs, similar to the actuarial accrued liability in a retirement actuarial valuation, and represents the liability associated with prior service.

GASB Statement No. 45

The actuarial cost method used in this valuation is consistent with the Governmental Accounting Standards Board (GASB) Statement No. 45, Accounting and Financial Reporting by Employers for Postemployment Benefits Other Than Pensions, issued June 2004. It is one of the allowable cost methods specified in that accounting standard, and is the cost method most similar to the prescribed method of accounting for these benefits in the private sector described in the Financial Accounting Standards Board Statement 106 (FAS 106).

Difference Between FAS 106 and GASB Statement No. 45

The GASB Statement No. 45 differs in one important regard from the actuarial cost method described in the private sector accounting standard. In the FAS 106 methodology, benefits are considered to be fully earned in the first 10 years of service, since members become vested in the retirement benefits in 10 years. Compared to the FAS 106 method, the GASB Statement No. 45 attribution method produces a lower accrued liability for future retirees. The cost of the benefit is spread over the expected working lifetime of the employee. This makes the cost of the benefit associated with the years of service the employee is providing. This is more appropriate for the public sector due to the relative permanence of public entities compared to private entities. There are other significant differences between the GASB Statement No. 45 and FAS 106, most noticeably in the choice of discount rate. The GASB Statement No. 45 discount rate assumption is discussed below.

ACTUARIAL ASSUMPTIONS

Details of the assumptions used in this valuation are shown in Section II. Here we present a brief discussion of the assumptions selected.

Demographic and Financial Assumptions

These include discount rates of 4.00% and 7.50% as well as mortality, disability, withdrawal and retirement rates. The 7.50% discount rate applies to the scenario of a fully funded program. A fully funded program is one in which the employer contributes 100% of the ARC each year. The 4.00% discount rate applies to the scenario of an unfunded program. An unfunded program is where only the pay-as-you-go value is contributed each year. GASB Statement No. 45 indicates that the discount rate for an unfunded post-employment benefit plan should be based on the degree to which the plan is funded. For an unfunded plan, the rate of return on the employer's general assets should be used. The rate we have used for this scenario is 4.00%. For a partially funded plan, where the entity has been setting aside some assets but less than the full ARC (not the case here), a rate between the fully funded plan and a completely unfunded plan should be used.

- Current health care costs by age

Initial health care cost assumptions were derived from premium rates for the various health care plans in-force at 1/1/2015. Typically, we analyze the plans offered in terms of four different categories: whether the plan offered is Commercial (not integrated with Medicare) or supplemental to Medicare and whether the plan is Indemnity (where reimbursements are a function of billed charges) or Managed Care (where reimbursements are a function of negotiated contracts). Grouping the plans in this manner allows us to maintain a reasonable degree of granularity in our analysis. At the same time, it avoids the problem of a lack of credibility that often arises if one attempts to analyze every plan separately.

As of 1/1/2015, Hanover had medical plans in two of these four categories (meaning there were enrollees in these plans): seven Commercial Managed Care plans and two Medicare Indemnity plans. Please refer to the "Plan Definition Table" on page 22 for more details. Note that other plans were offered but they did not have retiree enrollment.

For all of these plan categories, weighted-average costs for each plan grouping were calculated based on the actual Hanover active and retiree population enrollments. For plan categories with more than one plan, costs were based on an average weighted by enrollment. In order to capture the effect of aging on health care costs, an assumption is required for the increase in health care costs as a person ages. We based our aging assumption on a study sponsored by the Society of Actuaries Health Section in August 2003. The effect of this aging assumption is illustrated in the table of "Initial Claim Costs" in the Actuarial Methods and Assumptions section of this report. This method was applied only to the Commercial plans, since these plans incorporate both retirees and active employees. By age-grading the claim costs, we account for the subsidy of older employees by younger employees implicit in a flat premium rate (also referred to as the "Attributed Cost" of each employee). That is, the cost of an active 20-year old employee, for example, is much less than the cost of a retired 80-year old employee. But, the premiums charged the Town are flat – the same for both of these people. Thus, the 20-year old in our example is overcharged and the 80-year old is undercharged by a flat rate premium. Age-grading makes this subsidy mismatch between expected claims and premium

amounts explicit in the claim costs at each age. For the purposes of the GASB valuation, this subsidy needs to be taken into account in determining the retiree liability and normal cost.

Medicare plans were also age-graded. While there is no subsidy between actives and retirees in these plans, there is still an escalating cost by age that needs to be reflected. In particular, it should be noted that from one year to the next, the cost of a person in these plans (as well as commercial plans) increases due to two factors: (1) year-over-year medical trends and (2) the fact that the person ages one more year. Without age-grading the Medicare costs, we would understate the rate of increase in costs and so end up with smaller liabilities and associated annual costs.

- Cost trends

The claim rates developed using the methodology described above must be projected over the life of each retiree. For this purpose we use trend rates calculated to reflect the general rate of increase in Health Care costs. We developed different trends for each of the categories of plans for which we also developed claim costs. These factors were applied to the premium-based claim rates.

It should be noted that premium rate increases typically include factors other than health care cost increases, such as aging of the covered population, that are reflected elsewhere in our valuation methodology. Therefore, premium rate increases are not themselves a proxy for health care trends. However, they do give some indication of the level of expected cost increases.

As is the standard in post-retirement medical valuations, initially higher rates of health care cost trend are assumed to decrease over time to an ultimate rate consistent with long-term economic assumptions. Our general set of trend assumptions has Commercial Managed Care trends that begin at 9% and scale down to 5% by year eight. For Medicare Indemnity plans, the trends begin at 9% and grade down to 5% by year 28. These patterns are a change in our former assumptions, which had indemnity trends at an ultimate level of 6%. These different sets of trend rate reflect our belief that (1) Managed Care plans, with their negotiated pay levels and tighter controls, will exhibit lower trends than unmanaged Indemnity plans; and (2) Commercial plans will be subject to modestly higher trends than Medicare plans due to cost shifting induced by cutbacks in the federal government's payment of Medicare costs. These were the trends we used for our work except for the first year, where we used the actual premium changes for 2015.

These trend rates should be thought of not as a forecast but as a reasonable progression of rates based on historic patterns. Our new assumptions reflect the belief that ultimate trends for all plans must converge but that indemnity trends will be less reactive to prices. For many years, health care cost increases have been particularly volatile, and this actuarial assumption should be reviewed and, most likely, reset every year or two. Implicit in our health care cost trend assumptions is that the general rate of medical inflation will moderate due to economic pressure on insurers, employers, employees, retirees, government entities, and health care providers. As expectations of future health care cost increases change, they will be reflected in future valuations, resulting in actuarial gains/losses. These will be incorporated in the future costs and funding schedules. In this manner, there is a systematic means of adjusting to changes in the health care environment.

- Sensitivity analysis

The effect of increasing health care costs is extremely significant in an actuarial valuation of post-employment health benefits. As experience emerges the trend assumptions we have used are unlikely to be realized exactly. To illustrate the effect of different trend rates on the actuarial valuation results, we have included a sensitivity analysis of the effect on the actuarial accrued liability, normal cost and annual required contribution of a 1% increase or decrease in the health care cost trend assumption to the base (4.00%) discount scenario. We have also included a sensitivity analysis of the effect on the actuarial accrued liability, normal cost and annual required contribution of a 0.50% increase or decrease in the base (4.00% discount rate assumption).

- Timing

All values discussed in this report are based on a 1/1/2015 valuation. A draft version based on the 1/1/2015 valuation was used to prepare the Fiscal 2015 statements. This draft was based on incorrect information provided by the Town regarding the status of the OPEB Trust. We have not adjusted the Fiscal 2015 results to correct the amounts shown in the Town of Hanover's Fiscal 2015 audited financial statements. This report is to be used for Fiscal 2016, that is July 1, 2015 to June 30, 2016. It is permissible, under GASB Statement No. 45, to use these values, without adjustment for interest or any other timing factor for a limited future time period. For an entity such as Hanover, which will be doing a valuation every two years, the standard allows use of data "not more than twenty-four months before the beginning of the first of two years for which the valuation provides the ARC." This means that it is acceptable for us to use the 1/1/2015 results without adjustment when discussing the 2015 and 2016 Fiscal years. For this valuation, we have adjusted the figures for timing to Fiscal 2016. We believe this is acceptable if it is done consistently. We have shown projected costs for each fiscal year starting with 2016. If there are no cash contributions that differ from those assumed, you will be able to use the results for Fiscal 2016.

- Medicare

Medicare eligibility is an important assumption with regard to future costs. For those entities that have adopted Section 18 of Chapter 32B of the code (as has Hanover), we will assume that active employees who were hired after 3/31/1986 will be Medicare eligible due to their mandated participation in the Medicare program. Active employees prior to that employment date are assumed to be 85% Medicare eligible. Thus, we assume that 85% of those not Medicare eligible through the Town will obtain coverage through other employment or through their spouse. Such an assumption only applies to those hired by the Town prior to 4/1/1986. All employees hired after that date are automatically Medicare eligible. Eventually, this 85% assumption will no longer be necessary.

- Medicare Changes

The Medicare Prescription Drug, Improvement and Modernization Act of 2003 introduced significant changes to the Medicare program and its interaction with employer-sponsored post-retirement benefits. Medicare beneficiaries are able to participate in a voluntary, prescription drug coverage program. In order to encourage employers, including public-sector employers, to continue providing prescription drug coverage to retirees, the Act provides for a cash subsidy to employers whose prescription drug coverage is deemed to be actuarially equivalent to the new Medicare Part D drug coverage. This cash subsidy can be used to offset partially the cost of retiree medical benefits, including potentially reducing the accrued liability for a portion of the drug benefits provided by a retiree medical plan. The Act may have additional impact on retiree plan choices, as Medicare-eligible retirees may opt for the Part D coverage rather than an employer's plan options. Such changes, if they occur, may affect the selection of future actuarial assumptions.

GASB has indicated that the subsidy should not be included as part of the OPEB valuation. The reason being that the subsidy is considered general governmental revenue and as such is not earmarked towards the funding of OPEB benefits.

- Health plan coverage election

Assumptions must also be made regarding the participation in health plans when active members retire and when those already retired turn age 65. Using data supplied by Hanover, Stone Consulting modeled the behavior of employees as they moved from being active to being retired or moved from being an under age 65 retiree to being an age 65+ retiree. Such modeling involved an analysis of the distribution of the plans chosen by current retirees, the possible plans available to those who will retire in the future, and our opinions about the likely future course of retiree medical care. For this analysis, all departments were combined, since the plans available to all Hanover retirees are the same, regardless of department.

This model is applicable to actives and to retirees not yet age 65, since both of these groups will have the option to select plans at key ages. It should be kept in mind that these percentages are applicable even to actives not currently enrolled in a medical plan. The reason for this is that these people could change their behavior and enroll in a plan at retirement. The likelihood that they (or other actives) elect to do so is controlled by the participation assumption (see below). Some retiree groupings do not require any modeling. For example, retirees over age 65 are assumed to remain in the plans they have already selected. If they have opted out of Hanover coverage, we assume they will continue to do so. Similarly, those retirees under age 65 already in Medicare plans are assumed to remain in those plans for life. These are people who are disabled or have certain medical conditions that qualify them for Medicare early. Pre age 65 retirees in Commercial plans are assumed to stay in their current plan until age 65. At that point, they may migrate to a different plan. We have modeled their possible choices at age 65 and reflected them in our assumptions. Active employees over age 65, once they retire, are assumed to make the same sorts of selections as retirees at age 65.

The table on the following page shows the way we modeled the choices at each of the key ages.

Hanover Participant Behavior at Key Ages

Status	Age	Pre-65 Retirement	65+ Retirement
Active	Under 65	Commercial Managed Care: 100% Commercial Indemnity: 0%	Medicare Managed Care: 0% Medicare Indemnity: 100% Commercial Managed Care: <1%
Active	65+	NA	Medicare Managed Care: 0% Medicare Indemnity: 100% Commercial Managed Care: <1%
Retired	Under 65	Current Plan	Medicare Managed Care: 0% Medicare Indemnity: 100% Commercial Managed Care: <1%
Retired	65+	NA	Or Actual Plan if already in Medicare Current Plan

Participation

In addition to determining the choices that retirees will make among plans, there is also the issue of whether the retiree will elect coverage at all. The rate at which retirees elect coverage is called the "Participation" Rate. Stone Consulting reviewed Hanover retiree data to determine the historical frequency at which retirees elect to take medical coverage. Based on this review, we assumed that 67.5% of future eligible retirees and spouses of retirees will elect health plan coverage. For Life Insurance, we assumed that 50% Hanover of future retirees will elect coverage. These percentages reflect both actual Hanover participation to date as well as the likelihood that future participation rates will tend to drift up as alternative sources of coverage become less common.

It is also necessary to reflect the frequency of spouses in the Medical plans. Not all employees will have spouses and, for various reasons, not all spouses will participate in the plan. These reasons can include the availability of coverage from their own employer and the cost of the spouse coverage on top of the employee's coverage. We examined the number of spouses covered both pre-65 and post-65 and determined the implied percentage of spouses participating. Such analysis took into account that spouses may "participate" by virtue of being covered under family plans. The participation rate we developed was 50.0%. This is appreciably lower than previously expected as well as significantly lower than the assumption used in the 1/1/2011 valuation. We should also note that our expected frequency of spouses for an employee who is retiring typically is 80%. In other words, we typically expect 8 out of 10 retiring employees to have a spouse. However not all of these spouses will opt to participate.

Data

The participant census data for the valuation study was supplied by Hanover for the Town employees and the Massachusetts Teachers Retirement System for retired teachers. Participants include Hanover active employees including retirees, disability retirees, surviving spouses. We should note that, like many Massachusetts governmental entities, Hanover does allow Inactive former employees with 10 or more years of service to qualify for a vested post-retirement health benefit.

The participant census data was not audited by Stone Consulting, Inc. However, it was checked for reasonableness. Summaries of active participants and Hanover retiree census data are included in Section II.

Funding

There are alternative ways to plan for the payment of post-retirement health and life insurance benefits: continue to fund on a pay-as-you go method, contribute on an ad-hoc basis to a fund for this purpose, or develop a funding schedule in which the unfunded amount is amortized over some number of years. With the funding schedule, the normal cost must continue to be paid each year to keep current.

There is no legal requirement to prefund these other post-employment benefit liabilities. Nor does GASB Statement No. 45 require actual prefunding; however, its accounting requirements will serve to highlight the substantial unfunded accrued liabilities associated with these benefits.

ILLUSTRATIVE FUNDING SCHEDULE

The GASB Statement No. 45 is designed to account for non-pension post-employment benefits using an approach similar to the accounting for retirement benefits. It develops an Annual Required Contribution ("ARC") that is based on the Normal Cost plus an amortization of the Unfunded Actuarial Accrued Liability ("UAAL"). To the extent that actual contributions equal to the ARC are made by the employer to the post-employment health benefit plan, no additional liability will be required to be shown on Hanover's statement of assets. Employer contributions may be in the form of benefit or premium payments or contributions to a fund set aside for future benefit payments. Such a fund must meet the requirements set out in the accounting standard.

We have calculated an illustrative funding schedule for the other post-employment benefits, consistent with the GASB Statement No. 45. This funding schedule is based on the assumption that Hanover funds 100% of the ARC and begins with Hanover's Fiscal Year 2016. Since this schedule assumes full funding, the "funded" rate of 7.50% is used. The schedule assumes a 30-year closed amortization. This means that the UAAL for the first year is paid off over 30 years and that future UAAL's are paid off over a declining number of years. The schedule is derived by first applying interest to the funded results from our valuation. The full schedule is shown in Section II.

Development of Fully Funded Funding Schedule and Annual Required Contribution

The contribution amount under a fully funded scenario using the 7.50% discount rate for Fiscal 2016 is \$2,274,048. Part of this comes from the amortization of the 1/1/2016 Unfunded Actuarial Accrued Liability of \$23,623,326. This amount is equal to the base AAL of \$23,623,326 less the funding to date of \$0. The UAAL is amortized over thirty years at the rate of assumed payroll increase due to inflation (3.25%). The funding contribution is the amortization payment plus the projected normal cost. As noted earlier, under the GASB Statement No. 45, thirty years is the maximum amortization period allowed. Shorter periods of time and/or other amortization patterns could be considered. The thirty-year funding schedule shown produces the lowest possible initial fiscal year contribution under the GASB parameters. It should be noted that the contribution is assumed to be made at the beginning of the fiscal year, so the first contribution is assumed to be made July 1, 2015. The amount of the amortization payment in the first year is \$1,330,708. This figure also uses a 3.25% increasing amortization. For the purposes of this schedule, we adjusted the 1/1/2015 liability for timing by applying interest to bring it to Fiscal Year 2016. Thus, the Yearly contributions will increase, as both normal cost and amortization payments increase each year. The remaining part of the ARC is the cost of the current year's benefit accrual, the normal cost, of \$943,340.

Cash Flow Consideration

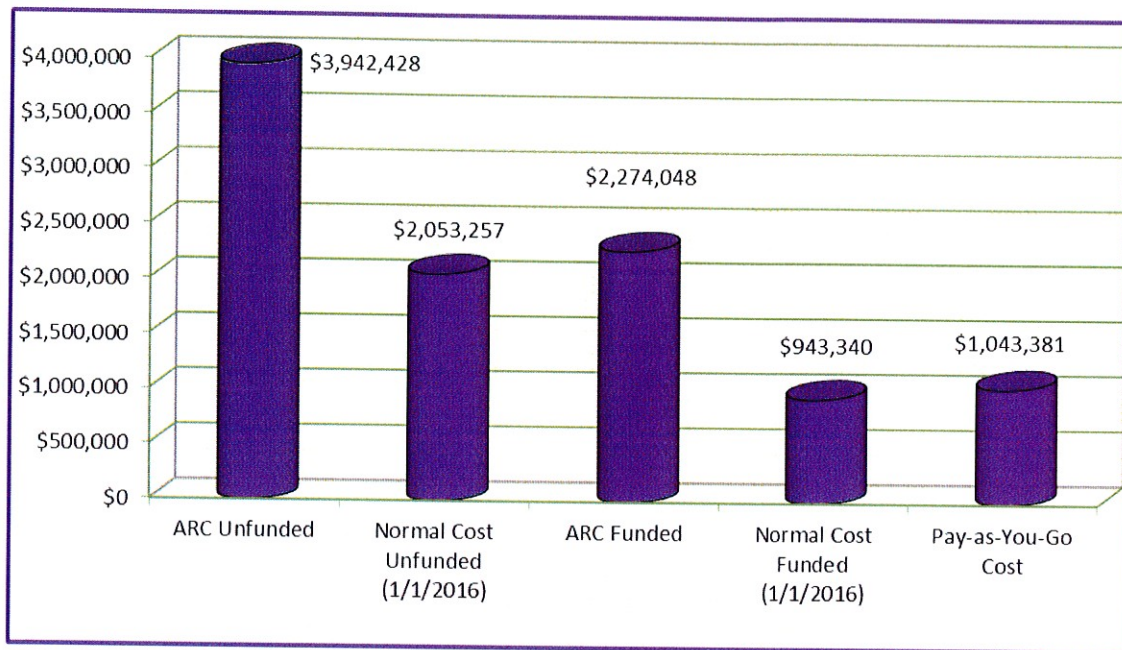
We have analyzed the cash flow of a funded other post-employment medical trust by comparing the expected payouts of claims over the thirty-year period to expected contribution levels. If the actuarial assumptions are met, the funded amounts will be sufficient to cover annual benefit payments each year. Prior to adopting a funding schedule we recommend additional analysis be conducted to examine the effects of potential actuarial gains and losses on the cash flow.

FUNDING VERSUS PAY-AS-YOU-GO VERSUS FUNDING

Currently, most Massachusetts governmental entities are paying for their post-employment medical benefits on a pay-as-you-go basis. This means that no amount in excess of the actual cost for the year is paid. All such entities must report figures for GASB Statement No. 45 based on the unfunded discount rate. Hanover has elected, to date, to follow this course of action.

In order to understand the impact of not funding versus funding completely, a comparison of the ARCs and normal costs (the contribution amount if the UAAL was \$0) under both scenarios, and the pay-as-you-go amount is illustrated in the following chart:

The chart below depicts the advantage to Hanover of fully funding, since the ARC and Normal Cost are significantly higher under the unfunded scenario. The figures shown incorporate timing adjustments to 1/1/2016. Currently, few Massachusetts entities are fully funding due to the financial demands of this expense.



As can be seen in the funding schedule, the retiree medical plan's normal cost will increase each year, so that by the time the initial unfunded liability is fully amortized, the required annual contribution will be substantially higher than is illustrated here for the first year. The pay-as-you-go costs will also increase dramatically as more and more employees retire. A projection of annual expected retiree pay-as-you-go costs is included with the funding schedule.

It is very important to understand that, in order to utilize the higher discount rate that goes with the fully funded or partially funded scenarios, there must be a "Funding Policy." That is, the Town must intend to continue to make payments and, in the future, must actually make them. Thus, it will be necessary for Hanover to establish a long-term policy in order to reduce the interest rate. As the figures above illustrate clearly, there is an iterative relationship between the degree of funding and the amounts that must be shown as liabilities, amortization payments, and normal cost figures. Lower funding levels lead to higher amounts for these key figures.

The partial subsidy of prescription drug benefit costs that is available under the Medicare Prescription Drug, Improvement and Modernization Act of 2003 is a potential source of funds for a portion of the retiree medical costs. To the extent that this subsidy reimburses Hanover for drug benefits it would already be paying for, the additional cash from the subsidy could be used to help pre-fund future benefits. The magnitude of any future subsidy is only a small portion of the additional cost to fund. Other plan design changes, such as a carve-out of prescription drug coverage or an Employer Group Waiver Plan (EGWP), may yield greater opportunities for savings.

DETERMINATION OF THE NET OPEB OBLIGATION (NOO)

The Statement does not require Hanover to put its entire Actuarial Accrued Liability on its books immediately as a liability. Rather, a cost is applied to its net assets each year. Over time this cost, which is called the OPEB Cost, will add up to the total liability. The total liability at any point in time is called the Net OPEB Obligation (NOO). For the first year of funding, the OPEB Cost and ARC are identical. Amounts contributed toward the cost of other post-employment benefits must then be deducted. These amounts include:

- 1) actual premiums paid;
- 2) the extra implied costs or "implicit subsidy" associated with covering retirees;
- 3) any additional amounts paid during the year.

The Net OPEB Cost is the OPEB Cost less these amounts. For year one, where there was no prior NOO on the financial statement, the Net OPEB Cost was the same as the Net OPEB Obligation. Starting with year two, the OPEB Cost must recognize not only the Normal Cost and Amortization Cost for the year but also add interest on the prior year's NOO as well as subtract the Annual Required Contribution (ARC) adjustment to prevent double counting the amortization of the prior year's NOO. The interest and the ARC adjustments somewhat offset each other so the net impact is not large. The total contributions are then subtracted from the OPEB Cost and the result is added to the prior year's NOO. In this manner, the difference between each year's ARC and the contributions are accumulated.

The unfunded actuarial accrued liability as of 1/1/2015 under the unfunded assumption would be \$37,818,945. This is the case as of this date, since Hanover had not yet made any payments above the pay-as-you-go level. With an adjustment for timing to Fiscal 2016, the UAAL is \$40,360,094. The chart on the following page illustrates the ARC, Pay-As-You-Go Cost, Annual OPEB Cost, and Net OPEB Obligation for the years 2009 through 2017 under the unfunded scenario. It does not reflect any additional contributions since Hanover has only put aside funds into a stabilization fund that is not an irrevocable trust. The Annual OPEB cost is the ARC plus an adjustment for interest not included in the ARC calculation. The Net OPEB Obligation is the accumulation of the Annual OPEB Cost minus any contributions. This is the amount that is subtracted from the Net Assets on Hanover's balance sheet. The rate used for interest is the 4.00% unfunded rate.

Town of Hanover
Other Post-Employment Benefits Valuation, 1/1/2015

Calculation of Net OPEB Obligation

"Funding" Schedule at 4.00%

Fiscal Year	UAAL	Normal Cost	Amort.	ARC	Interest on NOO	ARC Adjust.	OPEB Cost	Total Contribs. ⁽²⁾	Change in NOO	NOO ⁽³⁾
2009 ⁽¹⁾	\$33,604,043	\$1,742,113	\$2,013,411	\$3,755,524	NA	NA	\$3,755,524	\$973,931	\$2,781,593	\$2,781,593
2010 ⁽¹⁾	\$33,604,043	\$1,742,113	\$2,013,411	\$3,755,524	NA	NA	\$3,755,524	\$973,931	\$2,781,593	\$5,563,186
2011 ⁽¹⁾	\$47,798,319	\$2,270,648	\$1,938,430	\$4,209,078	\$234,198	\$276,126	\$4,167,150	\$1,141,412	\$3,025,738	\$8,588,924
2012 ⁽¹⁾	\$51,031,483	\$2,367,151	\$2,136,335	\$4,503,485	\$365,029	\$359,559	\$4,508,955	\$1,388,915	\$3,120,040	\$11,708,964
2013 ⁽¹⁾	\$54,249,954	\$2,467,754	\$2,347,561	\$4,815,315	\$497,631	\$506,683	\$4,806,263	\$1,487,770	\$3,318,493	\$15,027,457
2014 ⁽¹⁾	\$57,609,154	\$2,572,634	\$2,580,685	\$5,153,319	\$638,667	\$673,177	\$5,118,809	\$1,669,476	\$3,449,333	\$18,476,790
2015 ⁽¹⁾	NA	NA	NA	\$3,400,181	\$822,217	\$876,472	\$3,345,926	\$1,887,273	\$1,458,653	\$19,935,443
2016 ⁽⁴⁾	\$40,360,094	\$2,044,411	\$1,898,017	\$3,942,428	\$797,418	\$937,505	\$3,802,340	\$1,043,381	\$2,758,959	\$22,694,402
2017	\$43,036,641	\$2,126,188	\$2,108,445	\$4,234,633	\$907,776	\$1,111,841	\$4,030,568	\$1,185,883	\$2,844,685	\$25,539,087

¹ Figures for 2009-2015 (boxed area) from Hanover's Financial statements. In Fiscal 2015, the amount reflected in the 2015 Financial Statement was based on a draft report prepared by Stone Consulting, Inc. This was based on information provided by the Town of Hanover indicating that a cash contribution had been made into an irrevocable OPEB Trust. This information was incorrect and the contribution shown above should not have been included.

² For all years, Total Contributions are equal to the attributed premiums paid including the implicit subsidy. Payments to the stabilization fund are not included because this fund is not an irrevocable trust. Thus, no additional contribution are included.

³ NOO = Net OPEB Obligation

⁴ 2016 figures derived from base valuation adjusted forward one year.

Calculation of Net OPEB Obligation (Alternative Presentation)

	Fiscal 2017	Fiscal 2016	Fiscal 2015	Fiscal 2014 ⁽¹⁾	Fiscal 2013 ⁽¹⁾	Fiscal 2012 ⁽¹⁾	Fiscal 2011 ⁽¹⁾
AAL Assets UAAL	\$43,036,641 \$0 \$43,036,641	\$40,360,094 \$0 \$40,360,094	NA \$0 NA	\$57,609,154 \$0 \$57,609,154	\$54,249,954 \$0 \$54,249,954	\$51,031,483 \$0 \$51,031,483	\$47,798,319 \$0 \$47,798,319
Service Cost (Adj to year-end)	\$2,126,188	\$2,044,411	NA	\$2,572,634	\$2,467,754	\$2,367,151	\$2,270,648
Amortization of UAAL	\$2,108,445	\$1,898,017	NA	\$2,580,685	\$2,347,561	\$2,136,335	\$1,938,430
ARC	\$4,234,633	\$3,942,428	\$3,400,181	\$5,153,319	\$4,815,315	\$4,503,485	\$4,209,078
Interest on NOO (+)	\$907,776	\$797,418	\$822,217	\$638,667	\$497,631	\$365,029	\$234,198
ARC Adjustment (-)	\$1,111,841	\$937,505	\$876,472	\$673,177	\$506,683	\$359,559	\$276,126
OPEB Cost	\$4,030,568	\$3,802,340	\$3,345,926	\$5,118,809	\$4,806,263	\$4,508,955	\$4,167,150
Premiums and Implicit Subsidy Paid							
Cash contributions ⁽²⁾	\$1,185,883 \$0	\$1,043,381 \$0	\$996,290 \$890,983	\$1,669,476 \$0	\$1,487,770 \$0	\$1,388,915 \$0	\$1,141,412 \$0
Total Contributions	\$1,185,883	\$1,043,381	\$1,887,273	\$1,669,476	\$1,487,770	\$1,388,915	\$1,141,412
Change in NOO	\$2,844,685	\$2,758,959	\$1,458,653	\$3,449,333	\$3,318,493	\$3,120,040	\$3,025,738
NOO Beginning of Fiscal Year	\$22,694,402	\$19,935,443	\$18,476,790	\$15,027,457	\$11,708,964	\$8,588,924	\$5,563,186
NOO End of Fiscal Year	\$25,539,087	\$22,694,402	\$19,935,443	\$18,476,790	\$15,027,457	\$11,708,964	\$8,588,924

⁽¹⁾ Boxed area for Fiscal Years 2011 through 2015 based on Hanover financial statements. See footnote ⁽¹⁾ on prior page.

⁽²⁾ See footnote ⁽²⁾ on prior page.

Implementation

According to the GASB Statement No. 45, its provisions are effective for Hanover fiscal years beginning after 12/15/2007. The timing is due to Hanover being a "Tier 2" government under GASB 45. In the first fiscal year of adoption, Fiscal 2009, Hanover recorded a liability of \$2,781,593 on its balance sheet. Hanover's contributions (including benefit payments) for other post-employment benefits were less than the Annual Required Contribution ("ARC") determined in accordance with the GASB standard and described above. By the end of Fiscal 2016, Hanover will have recorded a figure of \$22,694,402 for its NOO.

This report provides information for FY2016 and beyond. For future years, a similar liability will need to be recorded. This liability would also reflect interest on any prior funding deficiencies. The total actuarial liability is determined by a valuation to be performed at least every two years. The total actuarial liability is reduced by any assets set aside to pre-fund the post-retirement benefits, with the resulting unfunded actuarial liability being amortized according to a funding schedule similar to that illustrated in this report.

To be considered a funded system, the plan assets must be "segregated and restricted in a trust, or equivalent arrangement, in which (a) employer contributions to the plan are irrevocable, (b) assets are dedicated to providing benefits to retirees and their beneficiaries, and (c) assets are legally protected from creditors of the employers or plan administrator, for the payment of benefits in accordance with the terms of the plan." (GASB 45, p. 47, "Plan Assets"). While Hanover has put aside some funds, the trust in which they have been deposited does not satisfy the GASB Statement Number 45 requirements for such funds.

Recommendations and Comments

Post-employment medical benefits are a significant long-term liability that is only now starting to be addressed by Massachusetts governmental employers. In managing this liability, any governmental entity needs to consider the parameters that can significantly influence the level of the liability. To facilitate such a review, we recommend that Hanover maintain a continuing group that is cognizant of the relevant financial and employee benefits issues raised by GASB Statement No. 45 that will provide leadership to the Town. We would recommend that the group review the following:

GASB STATEMENTS 74 AND 75

We recommend that the Town of Hanover follow the requirements of GASB Statements 45, 74, and 75 regarding the frequency of OPEB actuarial valuation preparation. OPEB actuarial valuations should be prepared at least as often as every two years. The next valuation would be as of January 1, 2017 as would be used for Fiscal 2018. Note that if a trust fund is established instead of just a stabilization fund, GASB Statement 74 will be applicable if an audited financial report is issued. You may wish to prepare a 1/1/2016 OPEB valuation in that case since the trust fund would be a significant event and should be reflected in your financial statements.

FUNDING POLICY

As previously discussed, the funding policy is critical to the valuation not only because it impacts the funds backing the liability but also because it impacts the discount rate that is used to calculate all of the relevant figures. Hanover needs to bear in mind that it is the formulation of a funding policy that is essential, not simply the contribution of funds. Of course, if a funding policy is developed, it needs to be implemented, not just formulated. We recommend that the Town review its funding policy each year.

PLAN DESIGN

One of the major factors influencing costs is the design of the plans that Hanover offers to retirees. To the extent that any part of these plans changes materially, costs may either increase or decrease.

In order to keep costs under control, the Town should review the design of all its medical plans annually. Changes in plan characteristics such as deductibles, coinsurance levels, out-of-pocket maximums, and covered services can help mitigate the impacts of ever-increasing medical costs or amplify these costs. In addition, the Town should review the networks it is using to be sure that it is getting the most competitive reimbursement levels available.

CONTRIBUTION LEVELS

The extent to which the Town subsidizes the cost of retiree benefits is one of the most significant factors in the ultimate costs. Currently, retired Hanover employees and their spouses pay 50% of the premium cost for their retiree medical insurance. This contribution level is the maximum permitted Massachusetts governmental entities are permitted to charge. The lower end of employee contribution rates is in the 10%-15% range while contributions tend to average around 25%. Contribution levels (like benefit levels) have a double impact on costs. First off, there is a direct relationship between contributions and costs in that higher contribution levels mean that more of the cost of the plan is borne by the Town. Secondly, higher contribution levels lead to higher participation rates because the plan becomes less costly to the retiree. In the case of governmental entities where a substantial portion of the medical costs are paid by the employer, participation rates tend to be very high. Hanover's participation level of 67.5% is about what we would expect, given its contribution requirements.

In general, a well subsidized plan will have many participants enrolled at a high cost. Also, to the extent that other employers are cutting back or eliminating their programs, there is increased likelihood that a favorably subsidized plan will be elected by retirees, since no coverage or only more expensive coverage may be available from other sources such as their spouse's employer. There was a definite move toward reducing the subsidies paid by Massachusetts public entities that seems to have slowed recently.

ELIGIBILITY

The extent to which retirees are eligible for benefits is another variable that directly impacts costs. Hanover should review its eligibility criteria each year to be sure that they are in accord with Town goals for controlling costs and for providing well-deserved benefits for those who have worked for the Town. Retirement system policies can also affect the eligibility for benefits. In the case of Hanover, the Town does pay for medical benefits for those who reach ten years of service even if such people do not retire from the Town immediately upon separation from service. This will produce a higher liability and ARC for Hanover than if only those actually retiring from the Town were covered.

In addition to reviewing the above items regularly, we recommend that the Town continue working toward an organized method of keeping its data. This is an issue faced by virtually all public entities with respect to GASB Statement No. 45. Some of the typical issues are:

- Be sure that it has a record of those eligible for coverage who do not take coverage. This should cover not only actives who are not enrolled but retired employees who opted out.
- To the extent possible, make sure that all databases can be tied together by a single identifier, such as social security number or employee number. Some entities keep certain data by, for example, social security number, but organize other data on some other basis. This greatly increases the time and effort to tie all the relevant pieces of data together. This need is particularly acute when the records for those in the Town are not kept by Hanover directly. It is helpful when consistent names are used in the databases, as well as full social security numbers, so that duplicates from the various databases can be checked against each other.

SECTION II - ACTUARIAL VALUATION DETAILS

Population Data

A. DISTRIBUTION BY AGE: RETIREES, BENEFICIARIES, AND SURVIVORS (Includes retirees with life only or no coverage)

Age	Total
0-19	0
20-24	0
25-29	0
30-34	0
35-39	0
40-44	1
45-49	1
50-54	5
55-59	10
60-64	41
65-69	108
70-74	104
75-79	66
80-84	37
85-89	33
90-94	13
95-99	2
100+	1
TOTAL	422

Includes retirees who are eligible for medical or with life coverage in addition to terminated vesteds, beneficiaries, and survivors with medical coverage.

B. ACTIVE PARTICIPANTS

OF PARTICIPANTS*

Current Plan	Mandatory Medicare Eligible	Pre-Mandatory Medicare Eligible	Total
No Medical/ Unknown	288	13	301
Indemnity	0	0	0
Managed Care	248	12	260
TOTAL	536	25	561

* "Pre-Mandatory Medicare eligible" means hired 3/31/1986 or before. "Mandatory Medicare eligible" means hired after 3/31/1986. Employees hired March 31, 1986 or before do not contribute to Medicare.

C. PLAN DEFINITION TABLE⁽¹⁾

Name of Plan	Type of Plan	Ind Rate	Retirees Enrolled	Fam Rate	Retirees Enrolled	EE Cont % ⁽²⁾
BCBS Blue Care Elect RS	Commercial Managed Care	\$883.00	6	\$2,094.00	10	50.00%
BCBS Blue Care Elect Benchmark	Commercial Managed Care	\$824.00	0	\$1,954.00	1	50.00%
BCBS Network Blue RS	Commercial Managed Care	\$607.00	18	\$1,618.00	86	50.00%
BCBS Network Blue Benchmark	Commercial Managed Care	\$581.00	0	\$1,549.00	2	50.00%
HPHC Benchmark	Commercial Managed Care	\$615.00	0	\$1,638.00	1	50.00%
HPHC HMO traditional	Commercial Managed Care	\$672.00	2	\$1,790.00	0	50.00%
HPHC HMO RS	Commercial Managed Care	\$642.00	9	\$1,710.00	48	50.00%
MEDEX III	Medicare Indemnity	\$410.00	188	NA	0	50.00%
HPHC Medicare Enhance	Medicare Indemnity	\$439.00	47	NA	0	50.00%
Life Insurance	Life	\$1.54	91	NA	NA	50.00%

(1) Rates at 1/1/2015. Only plans with retiree enrollment shown.

(2) Retirees pay 50% of premium for all plans; survivors pay 100% of premium for all plans

C. DISTRIBUTION BY AGE AND SERVICE: ACTIVE PARTICIPANTS

Age Group	0-4	5-9	10-15	15-19	20-24	25-29	30-34	35-39	40+	Total
0-19	1	0	0	0	0	0	0	0	0	1
20-24	17	0	0	0	0	0	0	0	0	17
25-29	35	8	1	0	0	0	0	0	0	44
30-34	22	24	12	1	0	0	0	0	0	59
35-39	19	18	24	10	2	0	0	0	0	73
40-44	18	11	18	12	2	1	0	0	0	62
45-49	29	14	11	14	8	5	0	0	0	81
50-54	14	18	16	9	5	8	1	1	0	72
55-59	18	10	19	13	3	4	4	1	0	72
60-64	9	6	7	17	7	4	2	0	0	52
65-69	7	2	3	4	4	1	2	0	0	23
70-74	0	2	1	1	0	0	0	0	0	4
75-79	0	0	0	0	0	0	0	0	0	0
80-84	0	0	0	0	0	1	0	0	0	1
85-89	0	0	0	0	0	0	0	0	0	0
90-94	0	0	0	0	0	0	0	0	0	0
95-99	0	0	0	0	0	0	0	0	0	0
100+	0	0	0	0	0	0	0	0	0	0
TOTAL	189	113	112	81	31	24	9	2	0	561

Summary of Results

Grand Total Actives	
- Already in Medicare	0
- Pre-Mandatory Medicare Coverage	25
- Post-Mandatory Medicare Coverage	<u>536</u>
Total	561
Retired, Disabled, Survivors and Beneficiaries	422
Terminated Vesteds	0

At 4.00% discount	
Active Employees	\$21,421,001
Current Retirees	<u>\$16,397,944</u>
TOTAL	\$37,818,945
Funding to date as of 1/1/2015	\$0
UAAL as of 1/1/2015	\$37,818,945
Normal (Service) Cost as of 1/1/2015 (adj to year end)	\$2,044,411
23-yr amortization of UAAL	<u>\$1,898,017</u>
TOTAL	\$3,942,428
UAAL as of 1/1/2016	\$40,360,094
Normal (Service) Cost as of 1/1/2016	\$2,053,257

Expected Claims

- Fiscal 2016: \$1,043,381

Schedule of Funding Progress Other Post-Employment Benefits (Dollars in Thousands)

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) [Projected Unit Credit] (b)	Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll (b-a)/c
1/1/2007	\$0	\$33,604	\$33,604	0%	\$24,891	135.0%
1/1/2011	\$0	\$47,798	\$47,798	0%	\$28,675	380.4%
1/1/2015	\$0	\$37,819	\$37,819	0%	\$35,989	105.1%

■ Town of Hanover
Other Post-Employment Benefits Valuation, 1/1/2015

Results by Enterprise Fund

Water

Year	UAL	Normal Cost	Amort.	ARC	Interest on NOO	ARC Adjust.	OPEB Cost	Total Contribs.	Change in NOO	NOO
2009	\$1,680,202	\$87,106	\$100,671	\$187,776	NA	NA	\$187,776	\$48,697	\$139,080	\$139,080
2010	\$1,788,339	\$90,590	\$101,247	\$191,837	NA	NA	\$189,526	\$53,079	\$136,447	\$275,527
2011	\$2,917,523	\$128,715	\$118,318	\$247,034	\$11,710	\$11,174	\$247,570	\$80,593	\$166,977	\$442,503
2012	\$2,723,895	\$134,186	\$114,031	\$248,216	\$18,806	\$18,525	\$248,498	\$98,069	\$150,429	\$592,933
2013	\$2,374,147	\$139,889	\$102,737	\$242,625	\$25,200	\$25,658	\$242,167	\$105,049	\$137,118	\$730,051
2014	\$2,521,156	\$145,834	\$109,847	\$242,625	\$29,202	\$31,808	\$240,019	\$117,879	\$122,140	\$852,191
2015	\$1,083,128	\$113,422	\$48,986	\$162,408	\$34,088	\$38,541	\$157,954	\$28,534	\$129,421	\$981,612
2016	\$751,807	\$117,959	\$35,355	\$153,314	\$14,565	\$17,124	\$150,756	\$4,298	\$146,458	\$510,582
2017	\$900,174	\$117,959	\$44,101	\$162,060	\$20,423	\$25,014	\$157,469	\$4,885	\$152,584	\$663,166

All Other

Year	UAL	Normal Cost	Amort.	ARC	Interest on NOO	ARC Adjust.	OPEB Cost	Total Contribs.	Change in NOO	NOO
2009	\$31,923,841	\$1,655,007	\$1,912,740	\$3,567,748	NA	NA	\$3,567,748	\$925,234	\$2,642,513	\$2,642,513
2010	\$33,978,444	\$1,721,208	\$1,923,701	\$3,644,908	NA	NA	\$3,601,002	\$1,008,506	\$2,592,496	\$5,235,010
2011	\$44,880,796	\$2,141,933	\$1,820,112	\$3,962,044	\$222,488	\$212,302	\$3,972,332	\$1,060,819	\$2,911,513	\$8,199,172
2012	\$48,307,589	\$2,232,965	\$2,022,304	\$4,255,269	\$348,465	\$343,243	\$4,260,491	\$1,290,846	\$2,969,645	\$11,168,817
2013	\$51,875,807	\$2,327,866	\$2,244,824	\$4,572,690	\$474,675	\$483,309	\$4,564,056	\$1,382,721	\$3,181,335	\$14,350,152
2014	\$55,087,998	\$2,426,800	\$2,470,838	\$4,910,694	\$609,465	\$641,369	\$4,878,790	\$1,551,597	\$3,327,193	\$17,624,599
2015	NA	NA	NA	\$3,237,773	\$788,129	\$837,931	\$3,187,972	\$1,858,739	\$1,329,232	\$18,953,831
2016	\$39,608,286	\$1,926,452	\$1,862,661	\$3,789,113	\$782,853	\$920,382	\$3,651,585	\$1,039,083	\$2,612,501	\$22,183,820
2017	\$42,136,467	\$2,008,229	\$2,064,344	\$4,072,573	\$887,353	\$1,086,827	\$3,873,099	\$1,180,998	\$2,692,101	\$24,875,921

Funding Schedule

30 Years at 7.50% with a 30-Year closed amortization

Fiscal Year	Normal Cost ¹	Amortization ²	Contribution	Year-End AAL	Projected Annual Benefit Cost ³
2016	\$943,340	\$1,330,708	\$2,274,048	\$23,964,564	\$1,043,381
2017	\$1,014,091	\$1,373,956	\$2,388,047	\$24,284,904	\$1,185,883
2018	\$1,090,148	\$1,418,610	\$2,508,757	\$24,581,266	\$1,287,472
2019	\$1,171,909	\$1,464,714	\$2,636,623	\$24,850,293	\$1,305,124
2020	\$1,259,802	\$1,512,318	\$2,772,120	\$25,088,324	\$1,397,772
2021	\$1,354,287	\$1,561,468	\$2,915,755	\$25,291,370	\$1,458,671
2022	\$1,455,859	\$1,612,216	\$3,068,074	\$25,455,091	\$1,460,825
2023	\$1,565,048	\$1,664,613	\$3,229,661	\$25,574,765	\$1,543,016
2024	\$1,682,427	\$1,718,712	\$3,401,139	\$25,645,256	\$1,626,990
2025	\$1,808,609	\$1,774,571	\$3,583,179	\$25,660,987	\$1,683,082
2026	\$1,944,254	\$1,832,244	\$3,776,499	\$25,615,898	\$1,730,628
2027	\$2,090,074	\$1,891,792	\$3,981,866	\$25,503,414	\$1,786,980
2028	\$2,246,829	\$1,953,275	\$4,200,104	\$25,316,399	\$1,831,205
2029	\$2,415,341	\$2,016,757	\$4,432,098	\$25,047,115	\$1,919,304
2030	\$2,596,492	\$2,082,301	\$4,678,793	\$24,687,175	\$1,955,689
2031	\$2,791,229	\$2,149,976	\$4,941,205	\$24,227,489	\$1,966,452
2032	\$3,000,571	\$2,219,850	\$5,220,421	\$23,658,211	\$1,998,585
2033	\$3,225,614	\$2,291,996	\$5,517,609	\$22,968,682	\$2,029,892
2034	\$3,467,535	\$2,366,485	\$5,834,020	\$22,147,361	\$2,070,385
2035	\$3,727,600	\$2,443,396	\$6,170,996	\$21,181,762	\$2,122,301
2036	\$4,007,170	\$2,522,807	\$6,529,976	\$20,058,377	\$2,158,492
2037	\$4,307,708	\$2,604,798	\$6,912,505	\$18,762,598	\$2,142,179
2038	\$4,630,786	\$2,689,454	\$7,320,239	\$17,278,630	\$2,156,852
2039	\$4,978,094	\$2,776,861	\$7,754,955	\$15,589,402	\$2,210,818
2040	\$5,351,452	\$2,867,109	\$8,218,561	\$13,676,465	\$2,190,459
2041	\$5,752,810	\$2,960,290	\$8,713,100	\$11,519,888	\$2,115,402
2042	\$6,184,271	\$3,056,499	\$9,240,771	\$9,098,143	\$2,029,838
2043	\$6,648,092	\$3,155,836	\$9,803,927	\$6,387,980	\$1,972,388
2044	\$7,146,698	\$3,258,400	\$10,405,099	\$3,364,298	\$1,938,221
2045	\$7,682,701	\$3,364,298	\$11,046,999	\$0	\$1,914,306

¹Assumes 7.50% annual increase in normal cost and a static group of actives

²Assumes 3.25% annual increase in the closed amortization payment

³The Pay-As-You-Go amount is for the current group of actives and retirees and is shown for the calendar year. It does not include any future hires. It is not directly comparable to the funding contribution but it included for illustrative purposes only. It does illustrate in the short-term, the estimated amount of claims costs for retirees. However, the retiree amount is expected to grow as new employees retire or become disabled.

Sensitivity Analysis

The results of any actuarial valuation are sensitive to the assumptions used. That is, a change in an actuarial assumption will produce a change in the actuarial accrued liability and/or normal cost each year of the valuation. To illustrate this sensitivity, we performed valuations in which we changed two different inputs: the trend rate and the discount rate.

TREND RATE SENSITIVITY

For postretirement medical plans in particular, the calculated actuarial values are highly sensitive to the assumed rate of health care cost trend. This is due to the compounding effect of the annual trend rates assumed for medical costs, as opposed to pension valuations where benefit levels typically remain fixed.

The following table illustrates the effect on our valuation results of a 1% increase or decrease in the assumed rates of health care cost trend in each year. The base scenario uses the unfunded discount rate of 4.00%.

Health Care Cost Trend Rates			
	As Reported (4.00%)	+1% Each Year	-1% Each Year
Liability for:			
■ Current Actives(Future Retirees)	\$21,421,001	\$27,204,434	\$17,152,031
■ Current Retirees, Beneficiaries, and Survivors	\$16,397,944	\$18,408,782	\$14,701,042
Total AAL	\$37,818,945	\$45,613,216	\$31,853,073
Normal Cost	\$2,053,257	\$2,688,285	\$1,583,941
Annual Required Contribution for Fiscal Year 2016:	\$3,942,428	\$4,997,784	\$3,168,523

The cumulative effect of a 1% increase in health care cost trend increases the AAL by approximately 21%, the normal cost by 31%, and the ARC by 27%. A 1% decrease in trend would decrease the AAL by 20%, the normal cost by 23% and the ARC by 20%.

There is the likelihood – based on historical experience – of significant deviations from the smooth rates of health care cost increase typically projected in any actuarial valuation. Therefore, emerging experience under the plan is likely to differ from the assumptions made as of any valuation date. This will produce actuarial gains and losses each year, even if the underlying assumptions remain reasonable for the future. Amortization of gains and losses will affect the updated funding schedule calculated at any point in the future.

DISCOUNT RATE SENSITIVITY

We also examined the sensitivity of the various key numbers to changes in the discount rate. For this testing, we varied the discount rate by 0.50%, or in other words, we used rates of 3.50% and 4.50%. The following table shows the results we obtained:

	Discount Rates		
	As Reported (4.00%)	Minus 0.50% (3.50%)	Plus 0.50% (4.50%)
Liability for:			
▪ Current Actives(Future Retirees)	\$21,421,001	\$24,147,614	\$19,105,232
▪ Current Retirees, Beneficiaries, and Survivors	\$16,397,944	\$17,403,701	\$15,484,006
Total AAL	\$37,818,945	\$41,551,315	\$34,589,238
AAL adjusted to 1/1/2016	\$40,360,094	\$44,524,476	\$36,749,834
Normal Cost	\$2,053,257	\$2,333,855	\$1,810,288
Annual Required Contribution for Fiscal Year 2016:	\$3,942,428	\$4,322,438	\$3,628,453

Thus, the cumulative effect of a 0.50% decrease in the discount rate is to increase the AAL by approximately 10%, the normal cost by 14%, and the ARC by 10%. A 0.50% increase in the discount rate would decrease the AAL by 9%, the normal cost by 12% and the ARC by 8%. It is prudent, and GASB Statement No. 45 requires, an updated actuarial valuation be performed periodically. For an entity of Hanover's size, a new valuation will be required at least every two years.

Actuarial Methods and Assumptions

ACTUARIAL METHODS

Actuarial Cost Method

Costs are attributed between past and future service using the Projected Unit Credit cost method. For attribution purposes, benefits are assumed to accrue over all employee service until decrement.

Interest Rate / Discount Rate

4.00% per year discount rate for the unfunded program. The assets in funded scenarios are expected to return 7.50% annually net of investment expenses.

Amortization Method

Open 23 year amortization (remainder of initial thirty-year amortization). Uses level percentage of payroll (using a 3.25% annual rate of increase).

Asset Valuation Method

Not applicable, since there are no assets at the valuation date.

ACTUARIAL ASSUMPTIONS

Valuation Date

1/1/2015

Mortality

- **Actives:** The RP-2000 Mortality Tables (Sex-distinct) for Employees with a base year of 2000 projected using generational mortality and scale BB.
- **Retirees:** The RP-2000 Mortality Tables (Sex-distinct) for Healthy Annuitants with a base year of 2000 projected using generational mortality and scale BB.
- **Disabled:** The RP-2000 Mortality Tables (Sex-distinct) for Healthy Annuitants with a base year of 2000 projected using generational mortality and scale BB, set forward 2 years.

No additional mortality projection is assumed other than as described above.

Actuarial Methods and Assumptions (Continued)

Eligibility for Vested Post-Retirement Medical Benefits upon Withdrawal

10 years of Service; assumed that individuals who withdraw prior to age 40 will elect a return of pension contributions and therefore be ineligible for retiree medical coverage

Withdrawal Prior to Retirement, Non-Teachers

Based on years of service. Same for both pre and post-April 1, 2012 hires.

Years of Service	Groups 1,2	Group 4
0	15.00%	1.50%
1	12.00%	1.50%
2	10.00%	1.50%
3	9.00%	1.50%
4	8.00%	1.50%
5	7.60%	1.50%
6	7.50%	1.50%
7	6.70%	1.50%
8	6.30%	1.50%
9	5.90%	1.50%
10	5.40%	1.50%
11	5.00%	0.00%
12	4.60%	0.00%
13	4.10%	0.00%
14	3.70%	0.00%
15	3.30%	0.00%
16	2.00%	0.00%
17	2.00%	0.00%
18	2.00%	0.00%
19	2.00%	0.00%
20	2.00%	0.00%
21	1.00%	0.00%
22	1.00%	0.00%
23	1.00%	0.00%
24	1.00%	0.00%
25	1.00%	0.00%
26	1.00%	0.00%
27	1.00%	0.00%
28	1.00%	0.00%
29	1.00%	0.00%
30+	0.00%	0.00%

Actuarial Methods and Assumptions (Continued)

Withdrawal Prior to Retirement, Teachers

Same for both pre and post-April 1, 2012 hires.

		Service		
	Age	0	5	10
Male Teachers	25	12.00%	4.50%	1.00%
	35	11.00	5.00	1.50
	45	9.50	5.00	2.00
	55	7.50	4.50	2.50
Female Teachers	25	10.00%	9.00%	5.00%
	35	12.00	8.40	4.10
	45	8.90	4.70	2.40
	55	8.00	3.20	2.00

Disability Prior to Retirement

The rates shown at the following sample ages illustrate the assumption regarding the incidence of disability. Disability is assumed to be 55% ordinary and 45% accidental for Group 1 and 10% ordinary and 90% accidental for Group 4 and 55% ordinary and 45% accidental for Teachers.

Rate of Disability			
Age	Groups 1 and 2	Group 4	Teachers
20	0.01%	0.10%	0.004%
25	0.02%	0.20%	0.005%
30	0.03%	0.30%	0.006%
35	0.06%	0.30%	0.006%
40	0.10%	0.30%	0.010%
45	0.15%	1.00%	0.030%
50	0.19%	1.25%	0.050%
55	0.24%	1.20%	0.080%
60	0.28%	0.85%	0.100%

Actuarial Methods and Assumptions (Continued)

Rates of Retirement, Non-Teachers

Based on gender, group, and hire date.

	Hired Pre-April 2, 2012			Hired Post-April 1, 2012		
Age	Groups 1 and 2 Male	Groups 1 and 2 Female	Group 4	Groups 1 and 2 Male	Groups 1 and 2 Female	Group 4
50	1.00%	1.50%	2.00%	-	-	-
51	1.00%	1.50%	2.00%	-	-	-
52	1.00%	2.00%	2.00%	-	-	-
53	1.00%	2.50%	5.00%	-	-	-
54	2.00%	2.50%	7.50%	-	-	-
55	2.00%	5.50%	15.00%	-	-	25.00%
56	2.50%	6.50%	10.00%	-	-	15.00%
57	2.50%	6.50%	10.00%	-	-	20.00%
58	5.00%	6.50%	10.00%	-	-	10.00%
59	6.50%	6.50%	15.00%	-	-	15.00%
60	12.00%	5.00%	20.00%	30.00%	30.00%	20.00%
61	20.00%	13.00%	20.00%	20.00%	10.00%	20.00%
62	30.00%	15.00%	25.00%	15.00%	12.00%	25.00%
63	25.00%	12.50%	25.00%	25.00%	10.00%	25.00%
64	22.00%	18.00%	30.00%	20.00%	15.00%	30.00%
65	40.00%	15.00%	100.00%	25.00%	13.00%	100.00%
66	25.00%	20.00%	NA	20.00%	18.00%	NA
67	25.00%	20.00%	NA	50.00%	40.00%	NA
68	30.00%	25.00%	NA	30.00%	25.00%	NA
69	30.00%	20.00%	NA	30.00%	25.00%	NA
70	100.00%	100.00%	NA	100.00%	100.00%	NA

Actuarial Methods and Assumptions (Continued)

Rates of Retirement, Teachers

Based on gender, years of service, and hire date.

Age	Hired Pre-April 2, 2102						Hired Post-April 1, 2012					
	<20 years service		20-29 years service		>29 years service		<20 years service		20-29 years service		>29 years service	
	M	F	M	F	M	F	M	F	M	F	M	F
50	N/A	N/A	1%	1.5%	2%	2%	N/A	N/A	N/A	N/A	N/A	N/A
51	N/A	N/A	1	1.5	2	2	N/A	N/A	N/A	N/A	N/A	N/A
52	N/A	N/A	1	1.5	2	2	N/A	N/A	N/A	N/A	N/A	N/A
53	N/A	N/A	1	1.5	2	2	N/A	N/A	N/A	N/A	N/A	N/A
54	N/A	N/A	1	1.5	2	2	N/A	N/A	N/A	N/A	N/A	N/A
55	3%	2%	3	3	6	6	3%	0%	0%	0%	0%	0%
56	8	2	5	3	20	15	8	0	0	0	0	0
57	15	8	8	7	35	30	15	0	0	0	0	0
58	15	10	10	7	50	35	15	0	0	0	0	0
59	20	15	20	11	50	35	20	0	0	0	0	0
60	15	20	20	16	50	35	25	25	35	23	45	45
61	30	20	25	20	50	35	35	30	35	30	45	45
62	20	25	30	30	40	40	30	25	30	25	45	45
63	30	24	30	30	40	30	35	25	30	25	45	45
64	40	20	30	30	40	35	40	30	35	30	45	45
65	40	30	40	30	50	35	40	30	35	30	45	45
66	40	30	30	30	50	35	40	30	40	30	45	45
67	40	30	30	30	50	30	50	35	45	35	55	45
68	40	30	30	30	50	30	50	35	45	35	55	45
69	40	30	30	30	50	30	55	35	45	35	55	45
70	100	100	100	100	100	100	100	100	100	100	100	100

■ Town of Hanover
Other Post-Employment Benefits Valuation, 1/1/2015

Medicare Eligibility

- Employees: 100% if hired 3/31/1986 or after; 85% if hired pre-3/31/1986
- Spouses: 100%

Selected Claim Costs by Age

Age	Commercial Managed Care Individual	Commercial Managed Care Blended ⁽¹⁾	Commercial Indemnity Individual	Commercial Indemnity Blended ⁽¹⁾	Medicare Managed Care	Medicare Indemnity
55	\$8,402.50	\$12,795.79	NA	NA	NA	\$2,660.75
60	\$10,027.83	\$15,270.94	NA	NA	NA	\$3,175.43
65	\$12,318.16	\$18,758.77	NA	NA	NA	\$3,900.69
70	\$14,280.12	\$21,746.56	NA	NA	NA	\$4,521.96
75	\$16,156.65	\$24,604.24	NA	NA	NA	\$5,116.19
80	\$17,838.24	\$27,165.07	NA	NA	NA	\$5,648.68
85	\$18,748.17	\$18,748.17	NA	NA	NA	\$5,936.82

⁽¹⁾ Blended rates below 65 are 50% Family and 50% Individual. Blended rates 65 and higher are 50% Family and 50% Individual. Individual rates are used for all participants 81 and higher.

Actuarial Methods and Assumptions (Continued)

Trend Rates by Plan

Year	Commercial Managed Care	Medicare Indemnity
2015	2.61%	-6.69%
2016	8.00%	8.00%
2017	7.50%	7.50%
2018	7.00%	7.00%
2019	6.50%	6.50%
2020	6.00%	6.00%
2021	5.50%	6.00%
2022	5.00%	6.00%
2023	5.00%	6.00%
2024	5.00%	6.00%
2025	5.00%	6.00%
2026	5.00%	6.00%
2027	5.00%	5.75%
2028	5.00%	5.75%
2029	5.00%	5.75%
2030	5.00%	5.75%
2031	5.00%	5.75%
2032	5.00%	5.50%
2033	5.00%	5.50%
2034	5.00%	5.50%
2035	5.00%	5.50%
2036	5.00%	5.50%
2037	5.00%	5.25%
2038	5.00%	5.25%
2039	5.00%	5.25%
2040	5.00%	5.25%
2040	5.00%	5.25%
2041	5.00%	5.00%

Trends shown are changes for each Fiscal Year. Calendar year claims are based on an average for the year.

Actuarial Methods and Assumptions (Continued)

Participation Rates

Current retirees and spouses are assumed to continue the same coverage they have as of the valuation date. No future election of coverage is assumed for those retirees and spouses who currently have not elected coverage.

Medical All Retirees: 67.5% of the active employees eligible for post-employment medical benefits are assumed to elect Medical Coverage immediately upon retirement.

Life All Retirees: 50% of active employees eligible for post-employment medical benefits are assumed to elect Life Insurance coverage immediately upon retirement.

For all Retirees: For the Town plans the frequency of spouses is assumed to be 50.0%.

Participants with no or unknown current coverage (e.g. active employees who do not currently participate in Hanover's medical plans) are assumed to elect retiree coverage at the same rates as currently covered active employees. Medicare-eligible retirees currently under age 65 are assumed to elect a Medicare plan option at age 65.

Plan Enrollment Rates

These are the rates at which retirees select medical plans, given that they enroll in a medical plan. The selection patterns follow the table on page 11.

Expenses

Administrative expenses are included in the per capita medical cost assumption.

Projections

The 1/1/2015 valuation was adjusted for timing when determining the funding schedule.

Section 9 ½ of Chapter 32B

No current or future payments or receipts are assumed due to past service or future service with other Chapter 32 entities.

PPACA

This valuation does not include any potential impact from the Patient Protection and Affordable Care Act (PPACA) other than those already adopted as of the valuation date. This includes new plans or taxes including the so-called "Cadillac Tax" high-cost health plans. The Cadillac Tax on benefits plans whose richness exceeds set levels will not begin until 2018. Prior to this time, the law may be amended or changes may be made in the benefit plan such that the law will not be applicable. In view of these uncertainties, we have elected not to try to estimate the Act's impact on costs and trends.

Contribution Timing

Contributions are assumed to be made at the beginning of the year.

Principal Plan Provisions Recognized in Valuation

ELIGIBILITY FOR BENEFITS

Current retirees, beneficiaries and spouses of Hanover are eligible for medical benefits, as are current employees or spouses who retire with a benefit from the Hanover. Survivors of Hanover employees and retirees are also eligible for medical benefits.

MEDICAL BENEFITS

Various medical plans offered by Hanover to its own employees.

LIFE INSURANCE

Hanover retirees are eligible for a \$2,000 life insurance benefit offered by Hanover. Retirees pay 50% of the \$1.54 cost.

RETIREE CONTRIBUTIONS

Based on data provided by Hanover.

Glossary

- **Actuarial Accrued Liability:** The portion, as determined by a particular Actuarial Cost Method, of the present value of benefits which is not provided for by future Normal Costs.
- **Actuarial Assumptions:** Assumptions as to the occurrence of future events affecting Other Post-employment Benefits such as: mortality rates, disability rates, withdrawal rates, and retirement rates, the discount assumption, and the trend rates.
- **Actuarial Cost Method:** A procedure for determining the Actuarial Present Value of Total Projected benefits and for developing an actuarially equivalent allocation of such value to time periods, usually in the form of a Normal and an Actuarial Accrued Liability.
- **Amortization Payment:** The portion of the OPEB contribution designed to pay interest and to amortize the Unfunded Actuarial Accrued Liability.
- **Annual OPEB Cost:** The accrual-basis measure of the periodic cost of an employer's participation in a defined-benefit OPEB plan.

■ Town of Hanover
Other Post-Employment Benefits Valuation, 1/1/2015

- **Annual Required Contribution (ARC):** The employer's periodic contributions to a defined benefit OPEB plan, calculated in accordance with the parameters defined in GASB 45. This is defined as the sum of the Normal Cost and the Amortization payment.
- **Commercial Plans:** Plans designed to cover the medical expenses of those not otherwise covered by Medicare.
- **GASB:** The Governmental Accounting Standards Board is the organization that establishes financial reporting standards for state and local governments.
- **Investment return Assumptions (Discount Rate):** The rate used to adjust a series of future benefit payments to reflect the time value of money. Under GASB 45, this rate is related to the degree to which the OPEB program is funded.
- **Healthcare Cost Trend Rate:** The rate of change in per capita health claims costs over time as a result of factors such as medical inflation, utilization of healthcare services, the intensity of the delivery of services, technological developments, and cost-shifting.
- **Medicare Plans:** Medical plans sold to those over 65 who are also covered by Medicare. These plans are supplemental to the Medicare plan, which is considered primary.
- **Net OPEB Obligation:** The cumulative difference, since the effective date of GASB 45, between the annual OPEB cost and the employer's contributions to the plan.
- **Normal Cost:** The portion of the Actuarial Present value of plan benefits that is allocated to a valuation year by the Actuarial Cost Method.
- **OPEB:** Other Post-Employment Benefits, other than pensions. This does not include plans such as severance plans or sick-time buyouts.
- **Pay-As-You-Go:** The amount of benefits paid out to plan participants during the year.
- **Per Capita Claims Cost:** The current average annual cost of providing postretirement health care benefits per individual.
- **Unfunded Actuarial Accrued Liability:** The portion of the Actuarial Accrued Liability that is not covered by plan assets. For a plan that is completely unfunded, this amount is equivalent to the Actuarial Accrued Liability.
- **Valuation Date:** The point from which all future plan experience is projected and as of which all present values are calculated.